AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Previously Presented) A method of inhibiting the corrosion of a metal surface contacted by an aqueous acid solution comprising:

(a) combining a corrosion inhibiting composition with the aqueous acid solution, the corrosion inhibiting composition comprising a reaction product of an alpha,beta-unsaturated aldehyde or an alpha,beta-unsaturated ketone with a primary or secondary amine, the reaction product comprising a reaction product selected from the group consisting of an imine, a hemiaminal, an iminium ion, and combinations thereof; and then

(b) contacting the metal surface with the aqueous acid solution containing the corrosion inhibiting composition.

2. (Previously Presented) The method of claim 1 wherein the alpha,beta-unsaturated aldehyde or ketone and the primary or secondary amine are separately added to water used to form the aqueous acid solution wherein the alpha,beta-unsaturated aldehyde or ketone and the primary or secondary amine react and form the reaction product therein.

3. (Previously Presented) The method of claim 1 wherein the metal surface comprises at least one metal selected from the group consisting of: J55 steel, N-80 steel, 13Cr alloy, 25 Cr alloy, Incoloy 825 and 316L.

4. (Previously Presented) The method of claim 1 wherein:

the alpha,beta-unsaturated aldehyde comprises at least one aldehyde selected from the group consisting of: crotonaldehyde, 2-hexenal, 2-heptenal, 2-octenal, 2-nonenal, 2-decenal, 2-undecenal, 2-dodecenal, 2,4-hexadienal, 2,4-heptadienal, 2,4-octadienal, 2,4-nonadienal, 2,4-decadienal, 2,4-undecadienal, 2,4-dodecadienal, 2,6-dodecadienal, citral, 1-formyl-[2-(2-methylvinyl)]-2-n-octylethylene, cinnamaldehyde, dicinnamaldehyde, p-hydroxycinnamaldehyde, p-methylcinnamaldehyde, p-ethylcinnamaldehyde, p-methoxycinnamaldehyde, p-dimethylaminocinnamaldehyde, p-diethylaminocinnamaldehyde, p-nitrocinnamaldehyde, o-nitrocinnamaldehyde, o-allyloxycinnamaldehyde, 4-(3-propenal)cinnamaldehyde, p-sodium sulfocinnamaldehyde, p-trimethylammoniumcinnamaldehyde sulfate, p-trimethylammoniumcinnamaldehyde o-methylsulfate, p-thiocyanocinnamaldehyde, p-(S-acetyl)thiocinnamaldehyde, p-(S-N,N-

dimethylcarbamoylthio)cinnamaldehyde, p-chlorocinnamaldehyde, 5-phenyl-2,4-pentadienal, 7-phenyl-2,4,6-heptatrienal, 5-(p-methoxyphenyl)-2,4-pentadienal, 2,3-diphenylacrolein, 3,3-diphenylacrolein, α-methylcinnamaldehyde, β-methylcinnamaldehyde, α-chlorocinnamaldehyde, α-bromocinnamaldehyde, α-butylcinnamaldehyde, α-amylcinnamaldehyde, α-hexylcinnamaldehyde, 2-(p-methylbenzylidine)decanal, α-bromo-p-cyanocinnamaldehyde, α-ethyl-p-methylcinnamaldehyde, p-methyl- α-pentylcinnamaldehyde, 3,4-dimethoxy-α-methylcinnamaldehyde, α-[(4-methylphenyl)methylene]benzeneacetaldehyde, α-(hydroxymethylene)-4-methylbenzylacetaldehyde, 4-chloro-α-(hydroxymethylene)benzeneacetaldehyde, α-nonylidenebenzeneacetaldehyde, 3,7-dimethyl-2,6-octadienal, and a beta-hydroxy aldehyde which dehydrates to form an alpha,beta-unsaturated aldehyde under acidic conditions; and

the alpha,beta-unsaturated ketone comprises at least one ketone selected from the group consisting of: 4-phenyl-3-buten-2-one, 3-methyl-1-phenyl-2-buten-1-one, 4-phenyl-3-penten-2-one, 5-phenyl-4-penten-3-one, 6-phenyl-5-hexen-4-one, 7-phenyl-6-hepten-4-one-2-ol, 7-phenyl-6-hepten-4-one, 1,3-diphenyl-2-propen-1-one, 1,3-diphenyl-2-buten-1-one, dicinnamalacetone, 1,7-bis(4-hydroxy-3-methoxyphenyl)-1,6-heptadiene-3,5-dione, mesityl oxide, phorone, isophorone, 3-methyl-2-cyclohexen-1-one, 3,6-dimethyl-2,6-cycloheptadien-1-one, 5-methyl-4-hexen-3-one, and a beta-hydroxy ketone which dehydrates to form an alpha,beta-unsaturated ketone under acidic conditions.

5. (Previously Presented) The method of claim 1 wherein the primary or secondary amine comprises at least one amine selected from the group consisting of: ethanolamine, diethanolamine, a partially ethoxylated dehydroabietylamine, ethylamine, diethylamine, dehydroabietylamine, propylamine, dipropylamine, propanolamine, isopropanolamine, 2-propanol-1-amine, diisopropanolamine, butylamine, dibutylamine, tert-butylamine, pentylamine, dipentylamine, and tert-benzyl-tert-butylamine.

6. (Previously Presented) The method of claim 1 wherein the reaction product results from a reaction of the primary or secondary amine with the alpha,beta-unsaturated aldehyde or alpha,beta-unsaturated ketone at a molar ratio of amine to aldehyde or ketone in the range of from about 0.1:1 to about 4:1.

7. (Previously Presented) The method of claim 1 wherein the corrosion inhibiting composition is combined with the aqueous acid solution in an amount in the range of from about 0.01% to about 5% by weight of the aqueous acid fluid.

8. (Previously Presented) The method of claim 1 wherein the corrosion inhibiting composition further comprises at least one corrosion inhibiting composition selected from the group consisting of an iodide source, a solvent, and a surfactant.

9. (Previously Presented) The method of claim 1 wherein the aqueous solution comprises water and at least one acid selected from the group consisting of: hydrochloric acid, acetic acid, formic acid, and hydrofluoric acid.

10. (Previously Presented) The method of claim 1 wherein the aqueous acid solution comprises water and hydrochloric acid, the hydrochloric acid being present in an amount in the range of from about 5% to about 28% by weight of aqueous acid fluid.

11. (Previously Presented) The method of claim 1 which further comprises contacting the metal surface with the aqueous acid solution at temperatures up to about 300°F when the aqueous acid solution comprises hydrochloric acid at a concentration of about 15% by weight thereof.

12. (Withdrawn) The method of claim 1 which further comprises contacting the metal surfaces with the aqueous acid flush at temperatures up to about 275°F when the aqueous acid solution comprises hydrochloric acid at a concentration of about 28% by weight thereof.

13–24. (Canceled)

25. (Previously Presented) The method of claim 1 which further comprises contacting the metal surface with the aqueous acid solution at temperatures up to about 300°F when the aqueous acid solution comprises hydrochloric acid at a concentration of from about 15% to about 28% by weight thereof.

26. (Previously Presented) The method of claim 1 wherein the corrosion inhibiting composition further comprises at least one component selected from the group consisting of a quaternary ammonium compound; a corrosion inhibitor activator; an acetylenic alcohol; a Mannich condensation product formed by reacting an aldehyde, a carbonyl containing compound, and a nitrogen containing compound; an unsaturated carbonyl compound; an unsaturated ether compound; formamide; formic acid; a formate; another source of carbonyl; an iodide, a terpene, and an aromatic hydrocarbon.

27. (Previously Presented) The method of claim 26, the quaternary ammonium compound having the formula:

$$(R)_4\ N^+X^-$$

wherein R comprises at least one group selected from the group consisting of: a long chain alkyl group; a cycloalkyl group; an aryl group; and a heterocyclic group, and wherein X is an anion.

28. (Previously Presented) The method of claim 26 wherein the quaternary ammonium compound comprises at least one compound selected from the group consisting of: an N-alkylpyridinium halide, an N-cycloalkylpyridinium halide, an N-alkylarylpyridinium halide, an N-alkylquinolinium halide, N-cycloalkylquinolinium halide, and an N-alkylarylquinolinium halide.

29. (Previously Presented) The method of claim 26 wherein the quaternary ammonium compound is present in the corrosion inhibiting composition in an amount in the range of from about 1% to about 45% by weight of the corrosion inhibiting composition.

30. (Previously Presented) The method of claim 26 wherein the corrosion inhibitor activator comprises at least one activator selected from the group consisting of: cuprous iodide, cuprous chloride, an antimony compound, an antimony oxide, an antimony halide, antimony tartrate, antimony citrate, an alkali metal salt of antimony tartrate, an alkalai metal salt of antimony citrate, an alkali metal salt of pyroantimonate, an antimony adduct of ethylene glycol; a bismuth compound, a bismuth oxide, a bismuth halide, bismuth tartrate, bismuth citrate, an alkali metal salt of bismuth tartrate, an alkali metal salt of bismuth citrate, iodine, an iodide compound, and formic acid.

31. (Previously Presented) The method of claim 26 wherein the corrosion inhibitor activator is present in the corrosion inhibition composition in an amount in the range of from about 0.1% to about 5.0% by weight of the composition.

32. (Currently Amended) A method comprising:

introducing an aqueous acid solution comprising a corrosion inhibiting composition into at least a portion of a subterranean formation, wherein the corrosion inhibiting composition comprises a ~~the~~ reaction product of an alpha,beta-unsaturated aldehyde or an alpha,beta-unsaturated ketone with a primary or secondary amine, the reaction product comprising a reaction product selected from the group consisting of an imine, a hemiaminal, an iminium ion, and combinations thereof.